DEFENSE ACQUISITION UNIVERSITY

PQM 301, Advance Production, Quality, and Manufacturing

100820

Course Learning/Performance Objectives followed by its enabling learning objectives on separate lines if specified.

1	**Given lecture, lesson materials and classroom discussions students will summarize the guidance, key activities and information required by defense acquisition policy for the initiation, development, production, fielding/deployment, and operational support of a Defense system, to include tailoring and planning for decision criteria that apply at each milestone review**
	Explain key activities for each phase and how they may be tailored to meet the various situations of particular programs
	Distinguish mandatory policies and procedures from discretionary practices and explain their impact on tailoring systems milestones, phases and information requirements
2	**Given lecture, lesson materials and classroom discussions students will classify Systems Engineering and/or Systems Engineering Process in terms of when it is applied, who applies it and the results of each Systems Engineering Process application. Point out Systems Engineering definitions, terms, and concepts, Integrated Product/Process Development concept; System Engineering application in the systems acquisition life cycle, and the Systems Engineering Process overview**
	Describe the inputs and outputs of the Systems Engineering Process for each Milestone decision and Acquisition Lifecycle phase
	Identify and describe the eight Technical Processes within the Systems Engineering "V" model and their respective inputs and outputs
	Identify and describe the eight Technical Management Processes associated with the Systems Engineering "V" model
	Describe the role of the production and quality manager within the Systems Engineering Process
3	**Given lecture, lesson materials and classroom discussions students will explain the relationships between yield, cost, cycle time, inventory levels, throughput, capacity and process variability**
	Describe the 5 M's and their role in manufacturing system design
	Describe the key planning and execution elements of manufacturing system design including yield, cost, cycle time, inventory levels, throughput, capacity and process variability
	Describe manufacturing as a design constraint, risk driver, and an enabling/critical set of technologies
4	**Given lecture, lesson materials and classroom discussions students will analyze and describe Lean practices, tools and concepts**
	Describe and analyze the key concepts of the Lean "House" model
	Describe Lean production tools and techniques and their use and benefits within the Acquisition Lifecycle
	Identify the benefits of Lean and their potential use and impact within the Department of Defense
5	**Given lecture, lesson materials, classroom discussions and an exercise students will be able to understand and summarize the key principles, and outline the major steps of the process, of value stream mapping**
	Explain the overall concepts and purpose of value stream mapping
	Discuss how to select, bound, and assign responsibility for mapping a value stream
	Use standard value stream mapping symbols and methods to create a current state map
	Use a current state Value Stream Map to analyze and describe the production environment and processes with a provided scenario
	Describe how Current State Value Stream Map analysis influences Future State Value Stream Mapping and Continuous Process Improvement activities
6	**Given lecture, lesson materials, classroom discussions and an exercise students will summarize the key principles, outline the major steps in the process and explain the impact of Performance Based Acquisition (PBA) on production and quality activities throughout the DoD acquisition life cycle**
	Explain the impact and benefits of PBA on the current DoD Acquisition Process
	Describe the characteristics of a well written performance specification
	Identify and describe the role of the production and quality manger in executing PBA
	Describe the role of Systems Engineering in the PBA process
	Evaluate and edit a provided Performance Specification
7	**Given lecture, lesson materials, and classroom discussions students will be able to define producibility and associated concepts**
	Describe producibility for given product examples
	Define key and critical characteristics
	Describe producibility as a design constraint, risk driver, and manufacturing enabler

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8	**Given lecture, lesson materials, classroom discussions and an exercise students will be able to demonstrate the relationship of customer requirements to engineering activities using Quality Function Deployment (QFD)**
	Demonstrate the steps necessary to construct a Phase I Product Planning Matrix (aka House of Quality) of the Quality Function Deployment (QFD) process
	Develop the Requirements Matrix (House of Quality) for an assigned product
	Explain how QFD could be used to support the Systems Engineering process throughout the Acquisition Lifecycle
9	**Given a case scenario and lecture materials students will evaluate correct application of Lean Concepts**
	Identify root cause(s) for production problems and defects
	Describe systematic and shop floor level actions required to eliminate problems and defects
	Define and describe key concepts of the Lean model
10	**Given lecture and class discussions students will identify and describe elements of an Advanced Quality System and their impact on the acquisition of DoD products and services**
	Compare and contrast the different definitions of quality and how they apply to the acquisition of DoD products and services
	Identify the elements of the Cost of Quality Model
	Distinguish the difference between internal and external failure cost in the Cost of Quality Model
	Differentiate between a basic quality system and an advanced quality system
11	**Given lecture and class discussion, students will be able to identify and assess basic supply chain design and operations issues for both contractor and defense industrial facility supply chains with particular emphasis on inbound logistics**
	Identify basic supply chain design factors and their importance
	Identify and assess basic supply chain operational issues, problems and risks
	Describe supplier selection criteria
	Identify supplier Key Performance Indicators
	Identify the role of information technologies in supply chain design and operations
	Describe the effects of information distortion, forecasting challenges and human nature on supply chain performance
	Describe the importance of velocity, visibility and variability reduction in supply chain management
12	**Given lecture, lesson materials and class discussion students will describe Information Technology theories and laws and their impact on the acquisition of DoD products and services**
	Define Moore's, Guilder's, Metcalf's and Coases' laws/theories
	Examine the implications of Lovejoy's Model for manufacturing and the design of supply chains
	Describe the impact of Moore's, Guilder's, Metcalf's and Coases' laws/theories and the Lovejoy model on DoD Supply Chain Management operations and strategies
13	**Given student lecture, and classroom discussion will explain how Environmental, Safety and Occupational Health (ESOH) considerations are incorporated into the Systems Engineering Process and Acquisition Lifecycle**
	Describe the six major ESOH considerations contained in the Defense Acquisition Guidebook (section 2)
	Explain the aspects of programmatic evaluation of ESOH considerations as documented by the Program Manager
	Identify and discuss methods, tools and techniques used to manage and mitigate ESOH risks
14	**Given a case scenario and lecture materials students will evaluate correct application of Supply Chain Management Concepts**
	Explain key aspects of Supply Chain Management strategies
	Describe the elements of a Virtually Integrated Supply Chain
	Evaluate the benefits of Virtual Integration
	Describe the challenges associated with applying Virtual Integration to Ford/DoD
15	**Given lecture, lesson materials and class discussion students will describe key elements of Activity Based Costing and its impact on the acquisition of DoD products and services**
	Define basic cost accounting concepts
	Compare and contrast traditional cost indirect cost accounting with Activity Based Costing

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	Describe the benefits and challenges of implementing Activity Based Costing
16	**Given lecture, lesson materials and classroom discussions students will describe Theory of Constraints practices, tools, concepts and applications**
	Identify the key metrics used in the Theory of Constraints
	Describe the five step process used in the Theory of Constraints
	Describe the key elements of Critical Chain Project Management
17	**Given lecture, lesson materials and classroom discussions students will identify the benefits, management challenges, technical challenges, and best practices for implementing an ERP System**
	Define an ERP System
	Identify the components of an ERP System
	Assess the benefits and challenges of implementing an ERP System
	Recognize ERP implementation lessons learned and best practices
18	**Given lecture, lesson materials, classroom discussions, and case studies students will describe key elements and apply tools for assessing manufacturing readiness and program status**
	Describe the key elements of Technology and Manufacturing Readiness Levels and the role of the Manufacturing Specialist in their assessment
	Identify and describe the key elements of the DoD Risk Process Model
	Describe the purpose of a Production Readiness Review and recognize best practices for conducting the review
	Conduct a Manufacturing Readiness Assessment on an assigned program identifying manufacturing and/or quality risks
	Identify and evaluate issues associated with an assigned case study reading
	Examine several core ethical values
	Point out the relationship between values and behavior
19	**Given lecture, lesson materials and class discussion students will describe key elements of Software Quality Management**
	Differentiate Software Quality Program, Evaluation and Assurance activities
	Describe the Software Development Plan and its application
	Describe the Software Quality Plan and its application
	Identify unique challenges associated with Software Quality
20	**Given lecture, lesson materials and classroom discussions students will identify current industrial base laws, policies, streamlining initiatives and issues and their impact on the acquisition of DoD products and services**
	Examine the key elements of the National Technology and Industrial Base (NTIB)
	Identify current DoD industrial policies
	Describe Industrial Base assessment activities and strategies
	Evaluate the impact of selected laws on the acquisition of DoD products and services
	Evaluate the impact of integrating COTS/NDI and best commercial practices into DoD products and services
	Identify the attributes of an effective Industrial Base management program
21	**Given lecture, lesson materials, classroom discussions and an exercise students will describe Six Sigma practices, tools, concepts and applications**
	Recognize and define the DMAIC process
	Identify best practices associated with Six Sigma
	Recognize Six Sigma level quality using Cp, Cpk and Normal distributions
22	**Given lecture, lesson materials and class discussion students will describe Design of Experiments, its application to the Systems Engineering Process and its impact on variation reduction**
	Define experimental design
	Identify Design of Experiments objectives and their impact on variability reduction
	Identify Design of Experiments inputs and outputs
	Contrast full versus fractional experimentation

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	Describe the benefits of the effective use of Design of Experiments
23	**Given lecture, lesson materials and class discussion students will recognize applications of computer modeling and simulation technologies available, their advantages and disadvantages and impact on production and quality activities throughout the DoD acquisition life cycle**
	Identify the applications of computer modeling and simulation technologies available for the factory floor
	Identify the advantages and disadvantages of computer modeling and simulation technologies in factory floor applications